What is claimed is:

1. A compressed gas-powered projectile accelerator, comprising:

a housing having a forward end and a rear end, the housing including:

a breech having a forward end and a rear end,

a gas distribution passage in communication with the breech, the gas distribution passage having a first end and a second end,

a valve passage in communication with the gas distribution passage, the valve passage having a first end and a second end, the valve passage, and

a bolt rest-point slot formed in the housing, the bolt rest-point slot in communication with the gas distribution passage, breech, and valve passage;

a bolt located within the breech and having a forward portion and a rear portion, the bolt adapted to move along a length of the breech between a forward position and a rearward position, the bolt biased toward the forward end of the housing by a bolt spring, the bolt having at least one aperture therethrough, the aperture adapted to allow compressed gas to pass between the rear end of the breech and the forward end of the breech when the bolt reaches a preselected position within the breech;

a valve slider located within the valve passage having a first end and a second end, the valve slider adapted to move along a length of the valve passage from a

first position to a second position, the valve slider adapted to selectively control the flow of compressed gas to the gas distribution passage, breech, and slot;

wherein at or near its rearward position, the bolt opens a flow path for compressed air to channel to the back of the bolt for urging the bolt toward the forward position, wherein at or near its forward position, the bolt opens an air passage for compressed air to flow through the aperture in the bolt.

2. The compressed gas-powered projectile accelerator according to claim 1, wherein the breech has a forward portion and a rear portion, and wherein a portion of the bolt is restricted from entering the forward portion of the breech.

3. The compressed gas-powered projectile accelerator according to claim 1, wherein the bolt further comprises a bolt rear seal adjacent the rear portion of the bolt and located between the bolt and a portion of the breech, the bolt rear seal blocking the passage of compressed gas between the bolt and the breech, and the valve slider adapted to selectively allow compressed gas to enter the breech and act upon the bolt for controlling the sliding of the bolt between a forward and rearward position.

4. The compressed gas-powered projectile accelerator according to claim 1, further comprising a spring guide positioned adjacent the rear end of the housing in the breech, the bolt spring positioned coaxially about the spring guide, the spring guide having a portion accepted into the bolt aperture, the bolt able to move coaxially about the spring guide, the spring guide allowing compressed gas to enter the bolt aperture when the bolt is at or near its forward position.

5. The compressed gas-powered projectile accelerator according to claim 1, further comprising a source gas passage in communication with the valve passage, the source gas passage adapted to receive compressed gas from a source of compressed gas.

6. The compressed gas-powered projectile accelerator according to claim 5, wherein the valve slider blocks compressed gas flowing between the source gas passage and the gas distribution passage when in its first position.

7. The compressed gas-powered projectile accelerator according to claim 5, wherein the valve slider allows compressed gas to flow between the source gas passage and the gas distribution passage when in its second position.

8. The compressed gas-powered projectile accelerator according to claim 5, wherein the valve slider blocks compressed gas from flowing between the gas distribution passage and the slot when in the second position.

9. The compressed gas-powered projectile accelerator according to claim 1, wherein the valve slider is biased toward the second end of the valve passage by a valve spring.

10. The compressed gas-powered projectile accelerator according to claim 5, further comprising a threaded shaft intersecting the source gas passage which may be adjusted to partially block the flow through the passage.

11. The compressed gas-powered projectile accelerator according to claim 1, wherein the housing further comprises a lower gas feed passage in communication with

and connecting the valve passage and the gas distribution passage, and adapted to receive compressed air when the valve slider is in the second position.

12. The compressed gas-powered projectile accelerator according to claim 11, wherein the housing further comprises an upper gas feed passage connecting and in communication with the valve passage and the breech, the upper gas feed passage adapted to receive compressed air when the valve slider is in the second position.

13. The compressed gas-powered projectile accelerator according to claim 1, further comprising a threaded passage in communication with the valve passage, said threaded passage adapted to receive a screw at one end.

14. The compressed gas-powered projectile accelerator according to claim 1, wherein the valve slider further comprises a valve slider front seal adjacent the first end of the valve slider, the valve slider front seal adapted to block the passage of compressed gas between the valve slider and a portion of the passage within which the slider is located.

15. The compressed gas-powered projectile accelerator according to claim 14, wherein the valve slider further comprises a valve slider rear seal adjacent the second end of the valve slider, the valve slider rear seal adapted to inhibit compressed gas from passing between the valve slider and a portion of the passage.

16. The compressed gas-powered projectile accelerator according to claim 15, wherein the valve slider further comprises a valve slider lock seal, the valve slider lock

seal adapted to inhibit compressed gas from passing between a portion of the valve slider and the valve passage.

17. The compressed gas-powered projectile accelerator according to claim 11, further comprising a valve locking shaft in communication with and connecting the gas distribution passage and the valve passage, the valve locking shaft located adjacent the first end of the gas distribution passage and forward of the lower gas feed passage, whereby compressed gas entering the valve locking shaft will act to bias the valve slider to its second position.

18. The compressed gas-powered projectile accelerator according to claim 1, wherein the valve passage further comprises an enlarged portion adjacent its second end where the gas distribution passage intersects the valve passage, and wherein the seals are spaced apart so that the distance between the seals is equal to or greater than the width of the enlarged portion of the valve passage.

19. The compressed gas-powered projectile accelerator according to claim 1, further comprising a manual cocking assembly, the manual cocking assembly:

a hollow cocking body in the rear of the housing adjacent the valve passage,

a plunger inserted into the cocking body, the plunger having a portion adapted to contact the valve slider, and a portion extending through the rear end of the housing, the plunger biased toward the rear end of the housing by a cocking spring, and

a plug maintaining the plunger within the housing.

20. The compressed gas-powered projectile accelerator according to claim 19, wherein the valve passage further comprises an enlarged portion adjacent its second end where the gas distribution passage intersects an extension of the cocking assembly body.

21. The compressed gas-powered projectile accelerator according to claim 5, further comprising a narrowed section of the source gas passage adjacent the valve passage.

22. The compressed gas-powered projectile accelerator according to claim 7, further comprising a prechamber, the prechamber adapted to provide a means for adjusting a first cycle rate for firing a projectile from the accelerator, the prechamber comprising:

an upstream throttling screw shaft in communication with the source gas passage,

a throttling screw engaging the upstream throttling screw shaft, the throttling screw adapted to selectively restrict the flow of compressed gas from the source of compressed gas through the source gas passage.

23. The compressed gas-powered projectile accelerator according to claim 1, further comprising a projectile feed passage in communication with the breech forward of the bolt, the projectile feed passage adapted to receive a projectile, a feed assist jet throttle, the feed assist jet throttle including a feed assist shaft in communication with the

gas distribution passage and the projectile feed passage, and a feed assist jet connecting and in communication with the feed assist shaft and the projectile feed passage

24. The compressed gas-powered projectile accelerator according to claim 1, further comprising a trigger for initiating a projectile accelerating cycle.

25. The compressed gas-powered projectile accelerator according to claim 24, further comprising an electronic control circuit for controlling the operation of the projectile accelerator, the electronic control circuit activated by the trigger.

26. The compressed gas-powered projectile accelerator according to claim 24, further comprising a sear adapted to releasably engage the valve slider, the valve slider is in contact with and held adjacent the first end of the valve passage by the sear connected to the trigger, wherein actuating the trigger disengages the sear from the valve slider permitting the valve slider to move toward the second end of the valve passage.

27. The compressed gas-powered projectile accelerator according to claim 26, further comprising a safety cam engaging the sear, wherein the safety cam is adapted to limit the movement of the sear.

28. The compressed gas-powered projectile accelerator according to claim 26, further comprising a mode selector cam adapted to provide for fully-automatic operation of the compressed gas-powered projectile accelerator.

29. The compressed gas-powered projectile accelerator according to claim 26, further comprising:

a detent in the valve slider;

a roller cam assembly including a rocker secured to the housing by a pin, the rocker adapted to rotate about the pin, the rocker having a rotatable wheel at one end adjacent the valve slider, the rocker biased to rotate toward the valve slider by a spring, the wheel adapted to engage the detent of the valve slider when the valve slider is in its first position.

30. A compressed gas-powered projectile accelerator, comprising:

a housing having a forward end and a rear end, the housing including:

a breech adapted to receive a projectile, the breech having a forward end and a rear end,

a gas distribution passage in communication with the breech, the gas distribution passage having a first end and a second end,

a valve passage in communication with the gas distribution passage, the valve passage having a first end and a second end, the valve passage adapted to received compressed gas from a compressed gas source, and

a bolt rest-point slot formed in the housing, the bolt rest-point slot in communication with the gas distribution passage, breech, and valve passage;

a bolt located within the breech having a forward portion and a rear portion, the bolt adapted to move along a length of the breech between a forward position and a rearward position, the bolt biased toward the forward end of the housing by a bolt spring, the bolt having at least one aperture therethrough, the aperture adapted to allow

compressed gas to pass between the rear end of the breech and the forward end of the breech when the bolt is at or near a preselected forward position;

a valve slider located within the valve passage having a first end and a second end, the valve slider adapted to move along a length of the valve passage from a first position to a second position, the valve slider adapted to selectively control the flow of compressed gas in the housing, the valve slider adapted to block the flow of compressed gas between the source of compressed gas and the gas distribution passage and allow the flow of compressed gas between the gas distribution passage and the slot in its first position, and adapted to block the flow of compressed gas between the gas distribution passage and the slot while permitting the flow of compressed gas between the source of compressed gas and the gas distribution passage when in the second position, the position of the valve slider controlling the sliding of the bolt between a forward and rearward position, and

wherein at or near its rearward position, the bolt opens a flow path for compressed air to channel to the back of the bolt for urging the bolt toward the forward position, wherein at or near its forward position, the bolt opens an air passage for compressed air to flow through the aperture in the bolt.

31. The compressed gas-powered projectile accelerator according to claim 30, wherein the bolt further comprises a bolt rear seal adjacent the rear portion of the bolt, the bolt rear seal blocking the passage of compressed gas between the bolt and breech, the

valve slider adapted to selectively allow compressed gas to enter the breech and act upon the bolt for controlling the sliding of the bolt between a forward and rearward position.

32. The compressed gas-powered projectile accelerator according to claim 30, further comprising a source gas passage in communication with the valve passage, the source gas passage adapted to receive compressed gas from a source of compressed gas.

33. The compressed gas-powered projectile accelerator according to claim 30, wherein the valve slider is biased toward the second end of the valve passage by a valve spring.

34. The compressed gas-powered projectile accelerator according to claim 32, further comprising a threaded shaft intersecting the source gas passage, and which may be adjusted to partially restrict the flow of compressed gas through the source gas passage.

35. The compressed gas-powered projectile accelerator according to claim 30, wherein the housing further comprises a lower gas feed passage in communication with and connecting the valve passage and the gas distribution passage, and adapted to receive compressed air when the valve slider is in the second position.

36. The compressed gas-powered projectile accelerator according to claim 35, wherein the housing further comprises an upper gas feed passage connecting and in communication with the valve passage and the breech, the upper gas feed passage adapted to receive compressed air when the valve slider is in the second position.

37. The compressed gas-powered projectile accelerator according to claim 30, wherein the valve slider further comprises a valve slider front seal adjacent the first end

of the valve slider, the valve slider front seal adapted to inhibit compressed gas from passing between the valve slider and the housing.

38. The compressed gas-powered projectile accelerator according to claim 37, wherein the valve slider further comprises a valve slider rear seal adjacent the second end of the valve slider, the valve slider rear seal adapted to inhibit compressed gas from passing between the valve slider and the housing.

39. The compressed gas-powered projectile accelerator according to claim 38, wherein the valve slider further comprises a valve slider lock seal, the valve slider lock seal adapted to inhibit compressed gas from passing between the valve slider and the housing.

40. The compressed gas-powered projectile accelerator according to claim 36, further comprising a valve locking shaft in communication with and connected to the gas distribution passage and the valve passage, the valve locking shaft located adjacent the first end of the gas distribution passage and forward of the lower gas feed passage, whereby compressed gas entering the valve locking shaft acts to bias the valve slider to its second position.

41. The compressed gas-powered projectile accelerator according to claim 30, wherein the valve passage further comprises an enlarged portion adjacent its second end where the gas distribution passage intersects the valve passage, the valve slider further comprising a pair of spaced seals adjacent its second end, and wherein the seals are

spaced so that the distance between the seals is equal to or greater than the width of the enlarged portion of the valve passage.

42. The compressed gas-powered projectile accelerator according to claim 30 further comprising a manual cocking assembly, the manual cocking assembly:

a hollow cocking body inserted into the rear of the housing adjacent the valve passage,

a plunger inserted into the cocking body, the plunger having a portion adapted to contact the valve slider, and a portion extending through the rear end of the housing, the plunger biased toward the rear end of the housing by a cocking spring, and,

a plug maintaining the plunger within the housing.

43. The compressed gas-powered projectile accelerator according to claim 32, further comprising a prechamber, the prechamber adapted to provide a means for adjusting a first cycle rate for firing a projectile from the accelerator, the prechamber comprising:

an upstream throttling screw shaft in communication with the source gas passage,

a throttling screw engaging the upstream throttling screw shaft, the throttling screw adapted to selectively restrict the flow of compressed gas from the source of compressed gas through the source gas passage.

44. The compressed gas-powered projectile accelerator according to claim 30, further comprising a projectile feed passage adapted to receive a projectile, the feed

passage being in communication with the breech forward of the bolt, a feed assist jet throttle, the feed assist jet throttle including a feed assist shaft in communication with the gas distribution passage and the projectile feed passage, and a feed assist jet connecting and in communication with the feed assist shaft and the projectile feed passage

45. The compressed gas-powered projectile accelerator according to claim 30, further comprising a trigger for initiating a projectile accelerating cycle.

46. The compressed gas-powered projectile accelerator according to claim 45, further comprising an electronic control circuit for controlling the operation of the projectile accelerator, electronic control circuit activated by the trigger.

47. The compressed gas-powered projectile accelerator according to claim 45, further comprising a sear connected to the trigger and adapted to releasably engage the valve slider, and wherein the valve slider is in contact with and held adjacent the first end of the valve passage by the sear, wherein actuating the trigger disengages the sear from the valve slider permitting the valve slider to move toward the second end of the valve passage.

48. The compressed gas-powered projectile accelerator according to claim 47, further comprising a safety cam engaging the sear, wherein the safety cam is adapted to limit the movement of the sear.

49. The compressed gas-powered projectile accelerator according to claim 48, further comprising a mode selector cam adapted to provide for fully-automatic operation of the compressed gas-powered projectile accelerator.

50. The compressed gas-powered projectile accelerator according to claim 47, further comprising:

a detent in the valve slider;

a roller cam assembly comprising a rocker, the rocker secured to the housing by a pin, the rocker adapted to rotate about the pin, the rocker having a rotatable wheel at one end adjacent the valve slider, the rocker biased to rotate toward the valve slider by a spring, the wheel adapted to engage the detent of the valve slider when the valve slider is in its first position.

51. A compressed gas-powered projectile accelerator, comprising:

an upper housing having a forward end and a rear end including a barrel, breech, and gas distribution passage;

a valve module housing in communication with the upper housing having a forward end and a rear end, the valve module housing adapted to receive compressed gas from a compressed gas source, the valve module housing comprising:

a valve passage having a valve spring passage adjacent the forward end of the valve module housing and in communication with a rear valve passage adjacent the rear end of the housing, and

a moveable spring cup disposed within the valve spring passage, the spring cup biased toward the rear of the housing by a spring;

a valve slider disposed within the rear valve passage and having a first end adjacent the valve spring passage and a second end adjacent the rear end of the rear valve

passage, the valve slider contacting a return spring at its second end, the return spring adapted to bias the valve slider toward the forward end of the housing, the valve slider adapted to selectively permit the flow of compressed gas to the gas distribution passage, breech, and slot;

a gas distribution passage in communication with the valve module housing and the breech, the gas distribution passage having a first end and a second end;

a bolt rest-point slot formed in the housing, the bolt rest-point slot in communication with the gas distribution passage, breech, and valve passage;

a bolt located within the breech having a forward portion and a rear portion, the bolt adapted to move along a length of the breech between a forward position and a rearward position, the bolt biased toward the forward end of the housing by a bolt spring, the bolt having at least one aperture therethrough, the aperture adapted to allow compressed gas to pass between the rear end of the breech and the forward end of the breech when the bolt reaches a preselected position;

wherein at or near its rearward position, the bolt opens a flow path for compressed air to channel to the back of the bolt for urging the bolt toward the forward position, at or near its forward position, the bolt opens an air passage for compressed air to flow through the aperture in the bolt.

52. The compressed gas-powered projectile accelerator according to claim 51, further comprising a cocking plunger inserted at the rear end of the valve module

housing, the cocking plunger adapted to contact the return spring to bias the valve slider to the forward end of the valve module housing.

53. The compressed gas-powered projectile accelerator according to claim 51, wherein the bolt further comprises a narrow forward portion located within a narrow forward portion of the breech, and an enlarged rear portion having a front end and a rear end located within an enlarged rear portion of the breech, the enlarged rear portion of the bolt having a bumper seal adjacent its front end and a bolt rear seal adjacent its rear end, the bumper seal and bolt rear seal blocking the flow of compressed gas between the bolt and a portion of the breech.

54. The compressed gas-powered projectile accelerator according to claim 51, wherein the bolt further comprises a bolt rear seal adjacent the rear portion of the bolt, the bolt rear seal substantially inhibiting passage of compressed gas between the bolt and a portion of the breech, wherein the valve slider is adapted to selectively allow compressed gas to enter the breech and act upon the bolt for controlling the sliding of the bolt between a forward and rearward position.

55. The compressed gas-powered projectile accelerator according to claim 51, further comprising a spring guide positioned adjacent the rear end of the housing in the breech, the bolt spring positioned coaxially about the spring guide, the spring guide having a portion accepted into the bolt aperture, the bolt able to move coaxially about the spring guide, the spring guide allowing compressed gas to enter the bolt aperture when the bolt is at or near its forward position.

56. The compressed gas-powered projectile accelerator according to claim 51, further comprising a source gas passage in communication with the valve passage, the source gas passage adapted to receive compressed gas from a source of compressed gas.

57. The compressed gas-powered projectile accelerator according to claim 56, wherein the valve slider substantially inhibits compressed gas from flowing between the source gas passage and the gas distribution passage when in its first position.

58. The compressed gas-powered projectile accelerator according to claim 56, wherein the valve slider allows compressed gas to flow between the source gas passage and the gas distribution passage when in its second position.

59. The compressed gas-powered projectile accelerator according to claim 56, wherein the valve slider substantially inhibits compressed gas from flowing directly between the gas distribution passage and the slot when in its second position.

60. The compressed gas-powered projectile accelerator according to claim 51, wherein the housing further comprises a lower gas feed passage in communication with and connecting the valve passage and the gas distribution passage, and adapted to receive compressed air when the valve slider is in the second position.

61. The compressed gas-powered projectile accelerator according to claim 60, wherein the housing further comprises an upper gas feed passage connecting and in communication with the valve passage and the breech, the upper gas feed passage adapted to receive compressed air when the valve slider is in the second position.

62. The compressed gas-powered projectile accelerator according to claim 51, wherein the valve slider further comprises a valve slider front seal adjacent the first end of the valve slider, the valve slider front seal adapted to substantially block the passage of compressed gas between the valve slider and a portion of the valve passage.

63. The compressed gas-powered projectile accelerator according to claim 51, wherein the valve slider further comprises a valve slider rear seal adjacent the second end of the valve slider, the valve slider rear seal adapted to substantially block the passage of compressed gas between the valve slider and a portion of the valve passage, and wherein the valve slider further comprises a valve slider lock seal, the valve slider lock seal adapted to substantially block the passage of compressed gas between the valve slider and a portion of the valve passage.

64. The compressed gas-powered projectile accelerator according to claim 61, further comprising a valve locking shaft in communication with and connecting the gas distribution passage and the valve passage, the valve locking shaft located adjacent the first end of the gas distribution passage and forward of the lower gas feed passage, whereby compressed gas entering the valve locking shaft will act to bias the valve slider to its second position.

65. The compressed gas-powered projectile accelerator according to claim 51, further comprising a manual cocking assembly, the manual cocking assembly including:

a hollow cocking body inserted into the rear of the housing adjacent the valve passage,

a plunger inserted into the cocking body, the plunger having a portion adapted to contact the valve slider, and a portion extending through the rear end of the housing, the plunger biased toward the rear end of the housing by a cocking spring, and,

a plug maintaining the plunger within the housing.

66. The compressed gas-powered projectile accelerator according to claim 51, further comprising a projectile feed passage in communication with the breech forward of the bolt, the feed passage adapted to receive a projectile, a feed assist jet throttle including a feed assist shaft in communication with the gas distribution passage and the projectile feed passage, and a feed assist jet connecting and in communication with the feed assist shaft and the projectile feed passage.

67. The compressed gas-powered projectile accelerator according to claim 51, further comprising a trigger for initiating a projectile accelerating cycle.

68. The compressed gas-powered projectile accelerator according to claim 67, further comprising an electronic control circuit for controlling the operation of the projectile accelerator, the electronic control circuit activated by the trigger.

69. The compressed gas-powered projectile accelerator according to claim 68, further comprising a sear connect to the trigger, the sear adapted to releasably engage the valve slider, the valve slider is in contact with and held adjacent the first end of the valve passage by the sear, wherein actuating the trigger disengages the sear from the valve slider permitting the valve slider to move toward the second end of the valve passage.

70. A compressed gas-powered projectile accelerator, comprising:

a housing having a forward end and a rear end, the housing including:

a breech having a forward end and a rear end,

a gas distribution passage having a first end in communication with the breech,

a valve passage,

a first passage extending between a second end of the gas distribution passage and the valve passage,

a bolt rest-point passage extending between the breech and the valve passage, and

a source gas passage connecting the valve passage with a source of compressed gas,

a bolt located within the breech and slidable between a forward position and a rearward position, the bolt having at least one aperture ending through a portion of it such that a medium can pass from the rear end of the breech through the bolt to a forward portion of the bolt;

a biasing means located within the housing for biasing the bolt toward the forward position; and

a valve slider located within the housing and having a valve head located within the valve passage, the valve slider being slidable between a first position and a second position, the first position of the valve slider locating the valve head in the valve

passage between the source gas passage and the first passage so as to inhibit communication between the source gas passage and the first passage, the second position of the valve slider locating the valve head between the first passage and the bolt rest-point passage so as to prohibit communication through the valve passage between the first passage and the bolt rest-point passage.

wherein at or near its rearward position, the bolt opens a flow path for compressed air to channel to the back of the bolt for urging the bolt toward the forward position, wherein at or near its forward position, the bolt opens an air passage for compressed air to flow through the aperture in the bolt.

71. A method of firing a paintball from a compressed gas-powered projectile accelerator, including a source of compressed gas, a valve passage having a valve slider, a breech for receiving the paintball, a bolt within the breech having an aperture therethrough, the method comprising:

(a) opening a flow channel between the source of compressed gas and the breech for biasing the bolt to the rear of the compressed gas-powered projectile accelerator by urging the valve slider to one location in the valve passage;

(b) channeling a flow of compressed gas to the rear of the bolt for urging the bolt toward a forward position; and

(c) channeling a flow path for compressed gas through the aperture of the bolt for launching the paintball from the breech.